

AIRLINE OPERATIONS MANAGERS: AN INTRODUCTION TO THE THIRD LEG OF THE NATIONAL AIR TRANSPORTATION SYSTEM

Karen Feigh & Amy Pritchett
Georgia Institute of Technology

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Outline

- ⊕ Airline Operational Managers (AOM)
- ⊕ Introduction to Contextual Inquiry
- ⊕ Cognitive Models
 - ◆ Flow Model
 - ◆ Physical Models
 - ◆ Artifact Models
 - ◆ Cultural Model
 - ◆ Sequence Models
- ⊕ AOM Impact on NAS Performance



Airline Operational Managers

⊕ Primary Task

- ◆ maintain the airline's published schedule
- ◆ ensuring that the on-time arrival and departure rates are within acceptable limits

⊕ Techniques

- ◆ Canceling flights or segments
- ◆ Delaying flights or segments
- ◆ Adding additional flights or aircraft
- ◆ Swapping aircraft, pilots, crew

⊕ Experience

- ◆ 20+ years in company

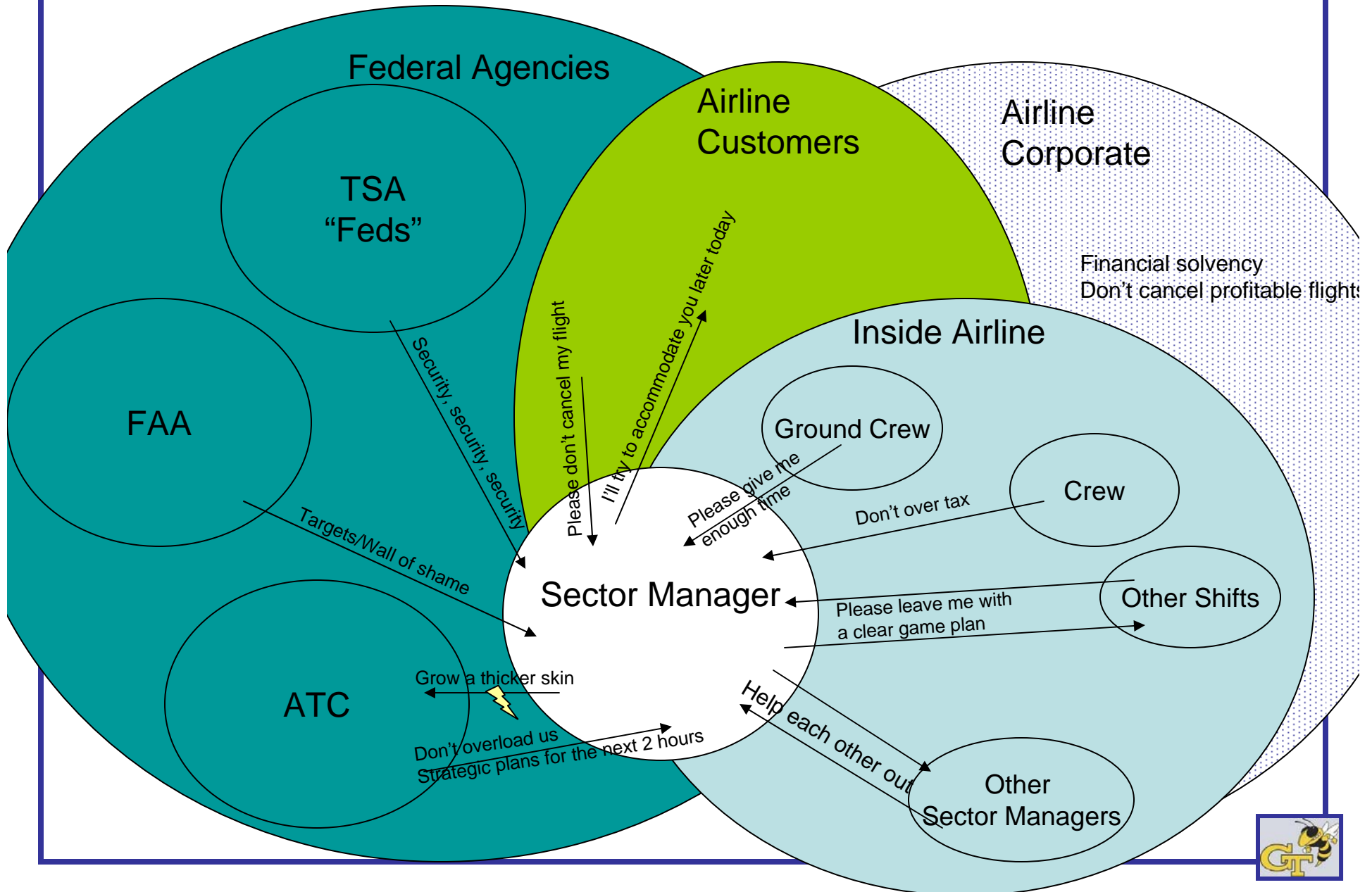


Contextual Inquiry

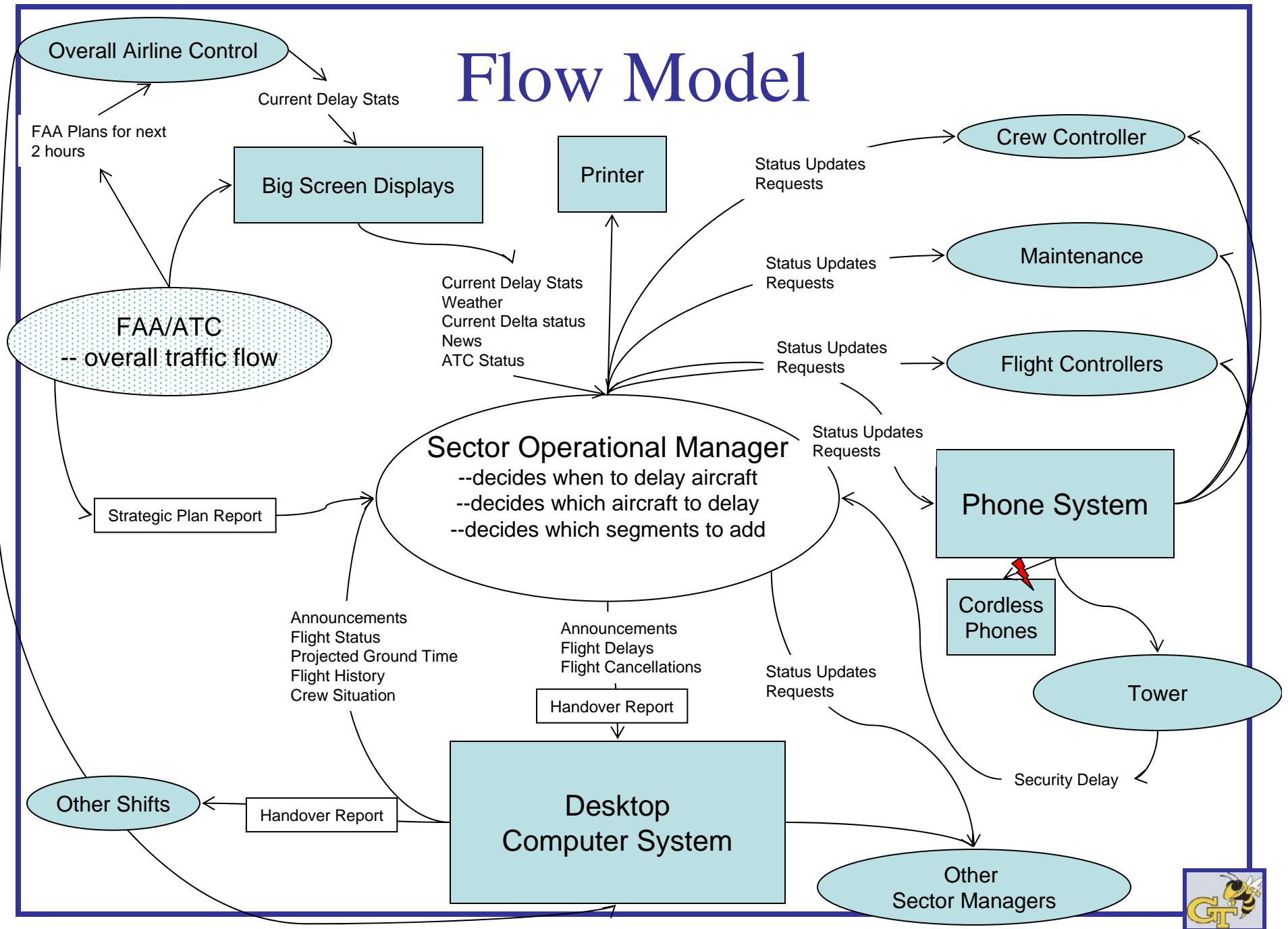
- ⊕ Interviewing technique described by Beyer & Holtzblatt
- ⊕ 4 Guiding Principles
 - ◆ Context – interview must be conducted in context
 - ◆ Partnership – adopt a mentor-mentee relationship
 - ◆ Interpretation – observations should be transformed into a set of cognitive models
 - ◆ Focus – interviewer should be an active observer: asking questions and steering conversation



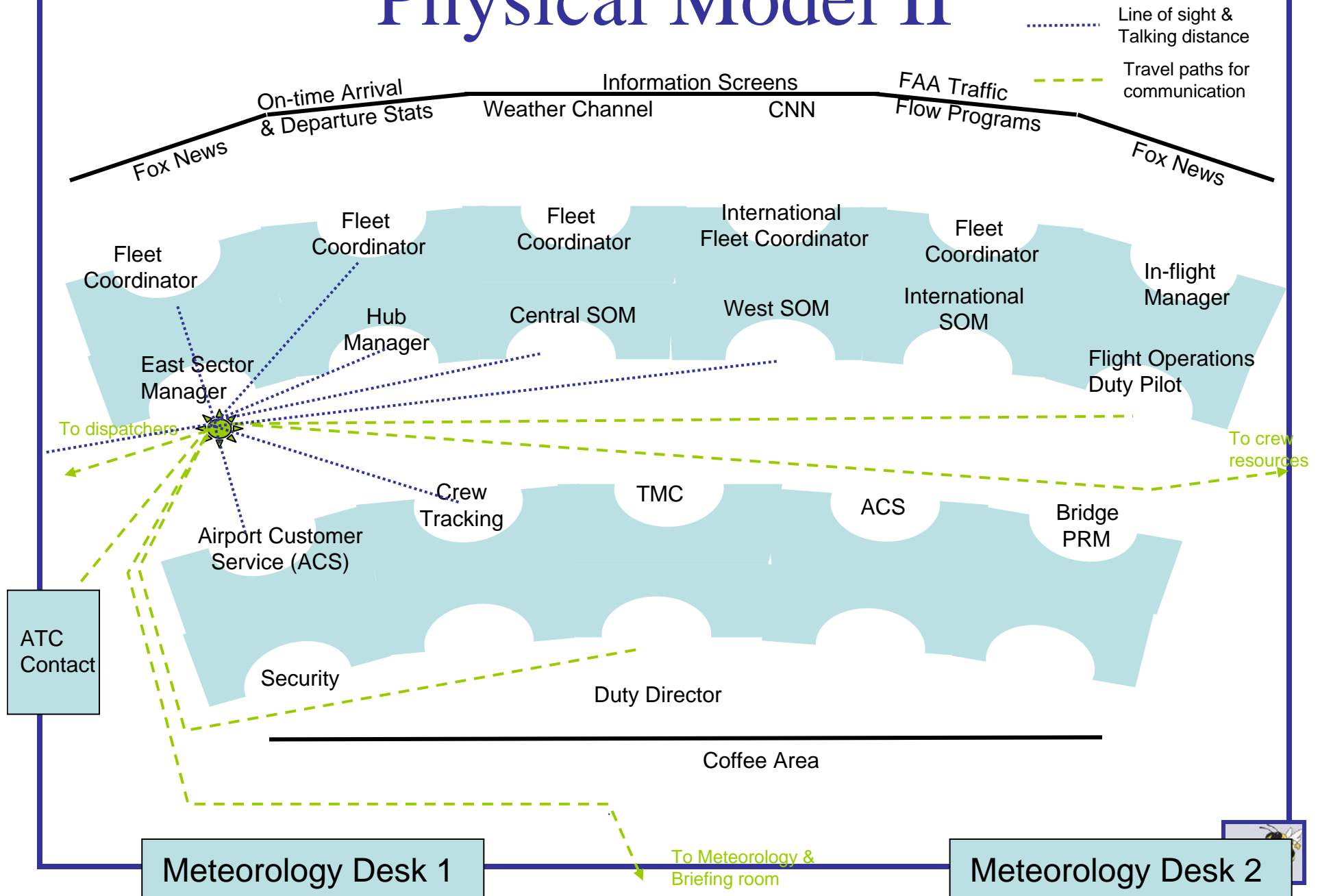
Cultural Model



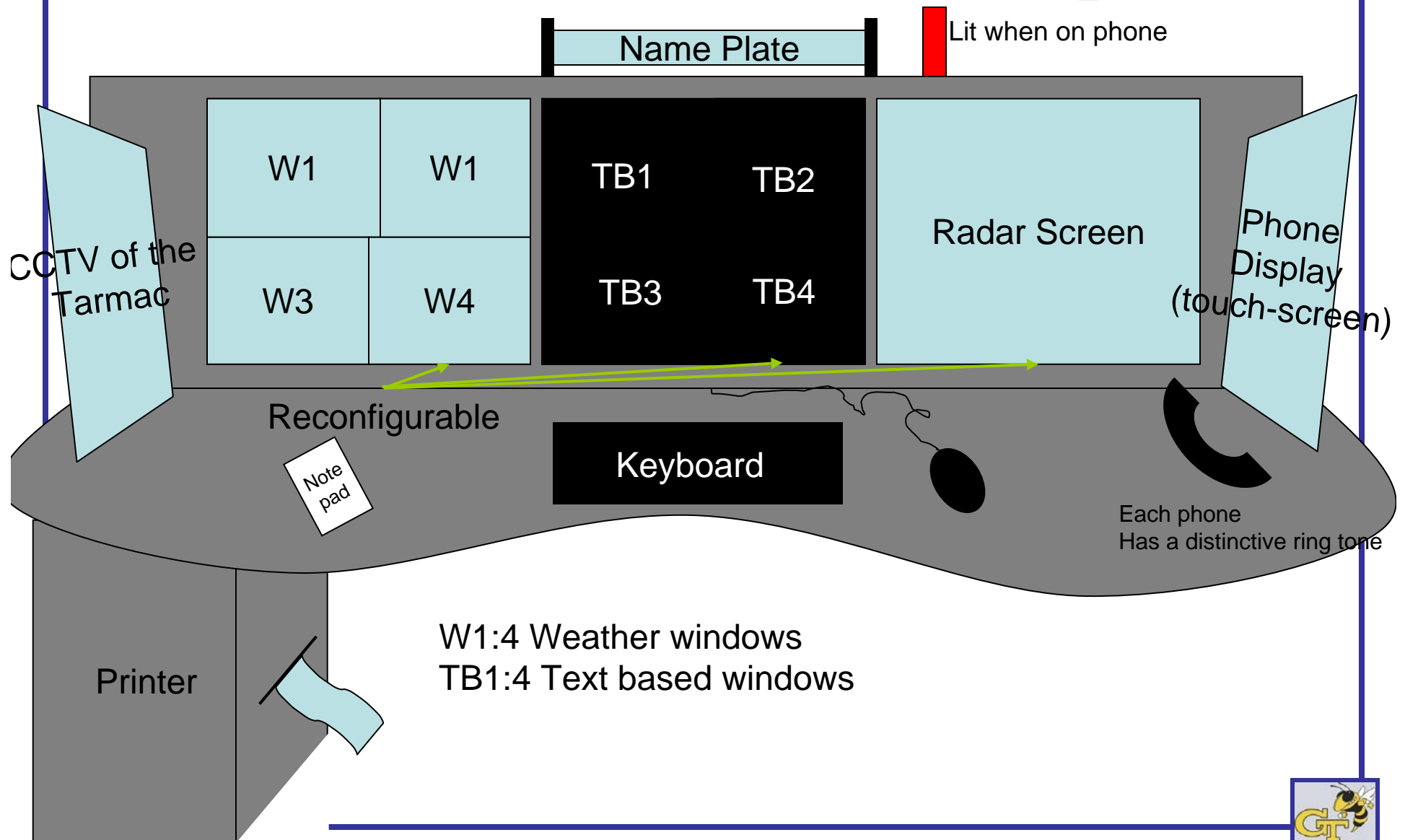
Flow Model



Physical Model II

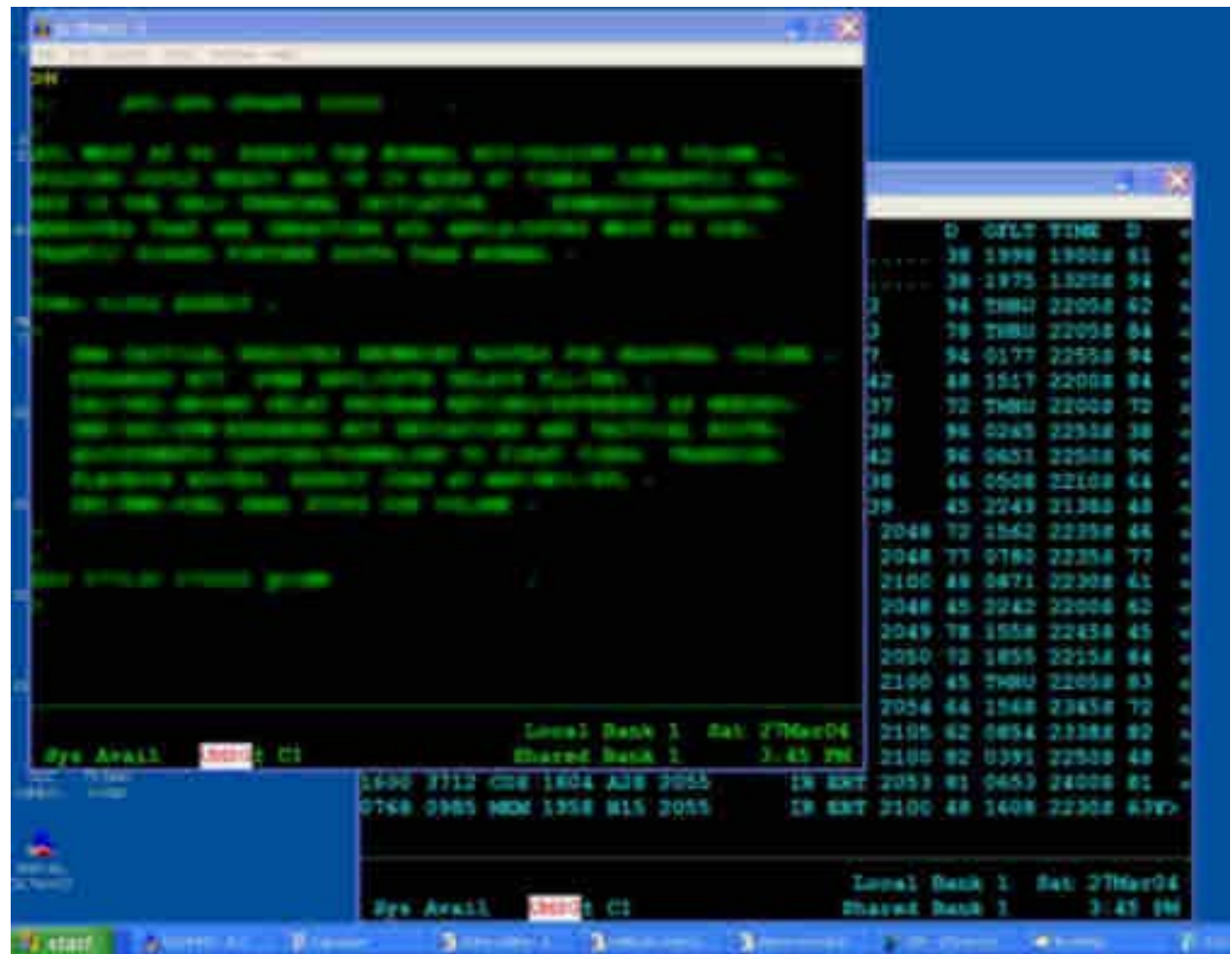


Artifact Model: Desktop



Artifact Model: DLTERM32

- Old text-based interface
- Primary interface used
- Primary source of information
- Requires memorization of text commands much like Unix or Linux
- Typos are a frequent problem



The screenshot displays the DLTERM32 interface, which is a text-based command prompt. The main window shows a list of data with columns for ID, GFLT, TIME, and a numerical value. The data is organized into two sections, each preceded by a header line. The first section has a header 'ID GFLT TIME D' and the second section has a header 'ID GFLT TIME D'. The data rows are as follows:

ID	GFLT	TIME	D
38	1898	19008	61
38	1875	13208	94
94	THRU	22008	60
78	THRU	22008	64
94	0177	22508	94
48	1517	22008	94
72	THRU	22008	72
94	0365	22508	38
94	0651	22508	94
44	0508	22108	64
45	2249	21388	48
72	1562	22308	64
77	0780	22308	77
48	0471	22308	61
45	2242	22008	62
78	1558	22458	45
72	1855	22158	64
45	THRU	22008	83
44	1548	23858	72
62	0854	21388	82
92	0391	22508	48
81	0453	24008	61
48	1408	22308	63V

The interface also shows a status bar at the bottom with the text 'Sys Avail' and 'Input CI'. The window title is 'DLTERM32'.

Artifact Model: ODT

Highlighted row will bring up history in lower pane

Arrival time:
Light Gray = early
Dark Gray = late
Sector managers look out for late flights

•List of flights ranked by arrival time

•Serves as a primary cue

✗Has 3 views, but only Duty Roster seems to be used

✗Weather and NOTAM are provided by other packages

Worldport S8 - 0300Z Total Flights: 700

File View Duty Roster Help

Duty Roster Weather NOTAM

Flight	Orig	Dptr Time	Dptr ...	Dest	A...	Arr...	S...	Status	Block	Hold	Prim ...	Sec ...	T/O ...	Dis...	Ld ...
1723A	SEA	1723A	1723A	ATL	1922A	-00:35	606	Complete	25000	:58				61	BD
1759A	SEA	1759A	1759A	ATL	1923A	-00:33	3734	Complete	15800	:44				83	DC
1714A	SEA	1714A	1714A	ATL	1929A	-00:31	914	Complete	26000	:55				64	DB
1717A	SEA	1717A	1717A	ATL	1932A	-00:27	691	Complete	26000	:45				63	BA
1745A	SEA	1745A	1745A	ATL	1934A	-00:26	312	Complete	16800	:45				83	DB
1040A	SEA	1040A	1040A	ATL	1936A	-00:59	184	Complete						32	CC
1808A	SEA	1808A	1808A	ATL	1939A	-00:24	938	Complete	19800	:58				62	BD
1817A	SEA	1817A	1817A	ATL	1940A	-00:13	1701	Complete	31000	:46	FLL			75	BA
1757A	SEA	1757A	1757A	ATL	1941A	-00:15	921	Complete	20800	:53				72	BA
1818A	SEA	1818A	1818A	ATL	1946A	-00:11	908	Complete	19000	:46				64	BA
1806A	SEA	1806A	1806A	ATL	1947A	-00:20	302	Complete	18800	:45				83	DA
0932A	SEA	0932A	0932A	ATL	1948A	-00:52	1601	Complete						32	AB
1841A	SEA	1841A	1841A	ATL	1948A	-00:02	137	Complete	27000	:44				48	CC
1801A	SEA	1801A	1801A	ATL	1948A	-00:06	372	Complete	18000	:48				48	DC
1816A	SEA	1816A	1816A	ATL	1949A	-00:13	939	Complete	19800	:51				63	DA
1828A	SEA	1828A	1828A	ATL	1951A	-00:18	953	Complete	19400	:44				46	CA
1816A	SEA	1816A	1816A	ATL	1951A	-00:18	962	Complete	20000	:50				84	BA
1808A	SEA	1808A	1808A	ATL	1953A	00:08	9002	Complete	21600	:54				72	BA
1839A	SEA	1839A	1839A	ATL	1955A	-00:13	929	Complete	18700	:50				84	CA
1747A	SEA	1747A	1747A	ATL	1956A	00:02	964	Complete	24600	:42				63	CA
1018A	SEA	1018A	1018A	ATL	1957A	-00:38	1602	Complete						35	AA
1804A	SEA	1804A	1804A	ATL	1958A	00:26	1819	Complete	62000	:50				94	DC
1805A	SEA	1805A	1805A	ATL	1959A	-00:04	9009	Complete	25000	:52	DAL			45	DA
1837A	SEA	1837A	1837A	ATL	1959A	00:17	117	Complete	28700	:45				78	BA

• Events FAM/FDM Alerts Remarks

Event Time	Flight	Orig	Remarks
27 Mar 19:57	0109	SEA	State is Complete
27 Mar 19:36	0109	SEA	At 27Mar 19:36 (27Mar 19:36 GMT)
27 Mar 19:25	0109	SEA	On at 27Mar 19:25 (27Mar 19:25 GMT) runway 6L
27 Mar 19:25	0109	SEA	On at 27Mar 19:27 (27Mar 19:27 GMT) runway 6L
27 Mar 19:23	0109	SEA	ETA of 27Mar 19:30 (27Mar 19:30 GMT)
27 Mar 19:23	0109	SEA	Outer Marker Crossing at 27Mar 19:25 (27Mar 19:25 GMT)
27 Mar 19:13	0109	SEA	ETA of 27Mar 19:30 (27Mar 19:30 GMT)

Fit Plan Fit Following Ship Rotation Pilot Fit Att M.E.L.

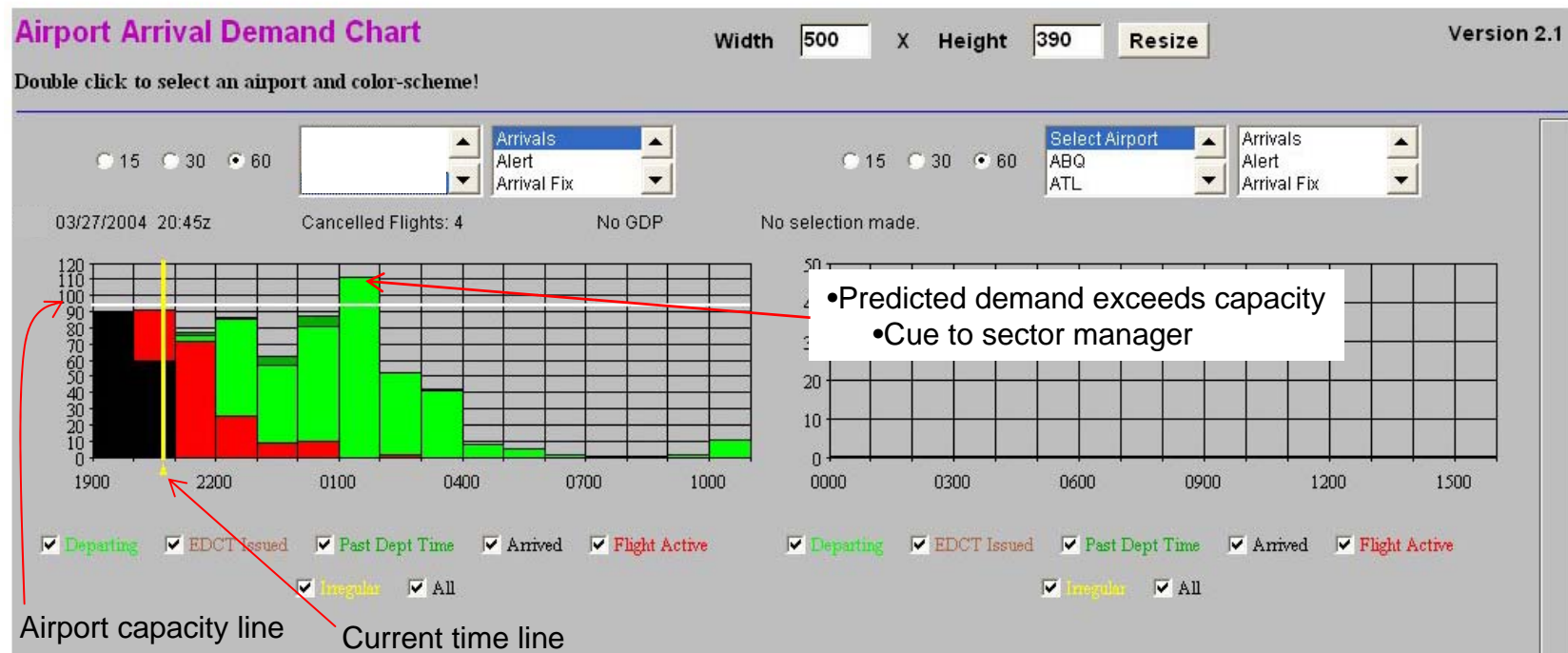
Ready ALL FLIGHT LEGS 20:50 GMT



Artifact Model: Predicted Airport Demand

Tool provided by the FAA via the web

- Shows previous airport demand
- Current airport demand
- Predicted airport demand



Sequence Model:

Get plane in ahead of other traffic

- Trigger: Airline Tower Call
 - Indicated that an aircraft was significantly behind its scheduled arrival time
- Intent: Verify that aircraft is behind lots of other traffic & if so plot solution
- Intent: Aircraft will be OK if it can be brought in ahead of all other Airline traffic
- Intent: Make sure that the passengers make their connections even if it means holding other aircraft for a few minutes
- Intent: Keep the Airline Tower up to date
- Intent: Make sure that the plane has a place to go when it gets down
- Checked graphical location of aircraft on radar display
- Pulled up info on aircraft on the text-based window
- Got up and went to talk to the FAA SOM to ask if the aircraft can have priority
- FAA contact will talk to his counterpart with the commuter airline
- Calls dispatcher to tell them about connections so dispatch might hold the planes and allow the connections to be made
- Calls Airline Tower back and updates him of current status
- Checks the gate availability



Sequence Model: Fuel Delays

- Trigger: Using the ODT, East SOM noticed that a plane out of Raleigh was late for no apparent reason
- Intent: find out what might be causing the delay
- Intent: ask for tankering out of Hub to minimize overall system delays caused by Raleigh
- Intent: to inform Raleigh that the request had been denied and why
- Intent: to inform his fellow sector managers and to find out if any of them knew, and how he managed not to know about the fuel shortage
- Intent: to inform follow on crews about the fuel shortage and Raleigh delay issues.
- E-SOM used TERM32 to review aircraft's history and found that something had happened at Raleigh when he was not on duty.
- Called a Raleigh to find out what was holding the plane up
 - Found out that an F-18 had crashed by the fuel farm and the wreckage was blocking the road to get fuel trucks to and from the terminal, causing delays
 - Asked to tanker at Hub for the weekend
- Walked to the Duty Director to see if it would be possible to tanker out of Hub for the weekend
 - No, Hub has a fuel shortage problem
- Called Raleigh back to tell bad news that they will just have to take the delays
- Shouted over to Hub & Central SOM stations to tell about Hub fuel shortage
- Wrote down the Hub fuel shortage and the Raleigh tanker delay problems in the SM activity report



AOM Impact on NAS Performance

- ⊕ AOMs minimize disturbances from requiring ATC intervention
 - ◆ 2004 Re-routing of all Tampa Bay area air traffic
- ⊕ AOMs implement ATC flow control measures
 - ◆ Managing airline's response to GDPs and GSPs
 - ◆ Response in turn influences duration and effectiveness of GDPs & GSPs
 - ◆ Coordinate with dispatchers to ensure adequate fuel for playbook re-routes



Conclusions

- ⊕ NAS has 3 main players
 - ◆ ATC
 - ◆ Pilots
 - ◆ Airlines that employ the pilots – AOMs in this context
- ⊕ AOMs serve as an extension of ATC flow control
- ⊕ AOMs play a large role in the ability of air traffic to recover after operational disruptions
- ⊕ R&D is needed to enable speedier airline responses to schedule disruptions



Comments & Questions

The Floor is Now Open

